tient being immediately placed in bed, is an excellent preliminary to this treatment, but an immediate and active treatment of the underlying and predisposing general systemic condition is of the greatest importance to supplement and assist the local applications.

Such measures actively carried out will frequently subdue a recent congestive glaucoma even of severe type, and may for a time restore the eye to an apparently healthy state; the cure, however, will rarely prove permanent, and with each recurrence the treatment is less likely to prove effectual; it is useful chiefly as a means of lessening the severity of the symptoms and of bringing the eye into more favorable conditions for operative treatment and the immediate benefit, however great, must not be allowed to obscure the fact that, in the majority of cases, a permanent cure can only be obtained by proper and timely operation.

It is scarcely to be conceived that a perfectly healthy individual, no matter how deformed or out of proportion the structure of the eyeballs, should become the victim of an attack of glaucoma, and experience has taught the writer, in those patients whom no argument could convince of the necessity of an operation, that prompt and thorough treatment of the condition responsible for the disturbance of the circulation and congestion of the venous system, has prevented a return of glaucomatous attacks. Pilocarpin to the production of very free diaphoresis has been a very useful medicament, given subcutaneously until its effect was well established and per os in increasing doses daily thereafter until the intraocular tension falls within reasonable limits.

Treatment of the absolute stage of glaucoma can avail nothing beyond the relief of pain, and this object is more certainly, speedily and satisfactorily attained by the removal of the useless organ than in any other way. Treatment of the various forms of secondary glaucoma is usually surgical, and consists of some variety of iridectomy, the broad peripheral form being most generally useful; but even in these cases the course of treatment given for the acute primary form of the disease sometimes relieves the patient.

I regret that personal experience does not allow me to speak favorably of epinephrin as an agent in the treatment of glaucoma, either for its specific action or as an adjuvant to cocain, for in other conditions this preparation materially enhances the astringent effect of cocain without adding to its action as a mydriatic.

THE TONSILS AS PORTALS OF INFECTION.*

By M. W. FREDRICK, M. D., San Francisco.

ALTHOUGH it is scarcely fifteen years since Gabbi called attention to the frequent association of tonsillitis and pneumonia, the importance of the part played by the tonsils as portals of infection for diseases in distant parts of the body is so great, and the idea such a plausible one, that the subject speedily gained recognition, and has been ably expounded in its different phases by a number of good writers and observers. In taking up the subject again, to-day, before this assembly, it is not done in the hope of adding anything new to what is already known, but rather with the purpose of eliciting the experience of the members present, and of calling attention to the subject on the part of those who have hitherto not taken the interest which the subject well deserves. In one of last May's medical periodicals a writer says: "It is nothing new to have a child complain of an attack of muscular or arthritic rheumatism while an attack of tonsillitis is at its height. The cause is, of course, principally due to rheumatic poison in the circulation." This is plainly an adherence to the old teaching that the tonsillitis is secondary, although about three months before, in the same journal, is contained a report of a paper read by Forcheimer at the fourteenth meeting of the American Pediatric Society in Boston, in May, 1902, wherein he says: "It is a long-established fact that the tonsils are the seat of infection for diseases in remote parts of the body; diphtheria, tuberculosis, pneumonia, scarlet fever, measles, jaundice, appendicitis, being some of the diseases which may be introduced by this route."

In the beginning I should like to state that by tonsils I do not mean the faucial tonsils alone, but that collection of lymphoid tissue in the upper respiratory tract, which has been called collectively Waldeyer's lymphoid ring, and includes the nasal, the pharyngeal, the faucial, the lingual, and the laryngeal tonsils, as well as those patches of lymphoid tissue which are scattered over the posterior pharyngeal wall. All these bodies have the same anatomic structure, consisting, as they do, of crypt-like invaginations of the epithelium surrounded by aggregations of lymphoid cells. I do not understand what Kyle means when he says in his text-book (page 354) that these bodies are not related from a physiologic point of view. In fact, it has been hard in modern times to find any function for these bodies which would justify their prominent position and offset the amount of mischief which they cause. Dr. Bosworth of New York says that if the tonsils have any claim to be regarded as normal organs of the body, their right to such a claim has not been clearly made out. If they are normal organs, nature, in creating them, has been guilty of a crudeness for which there is no analogy in the whole human body, except, possibly, the vermiform appendix. Believing in the wisdom of nature, and the axiom that she ascribes some work to everything she creates, various functions have been ascribed to the tonsils, chief of which was the lubricating of the bolus by the faucial tonsils as it passed through the isthmus faucium. This view has few, if any supporters at present. One has but to consider the short time spent by the food in passing through the isthmus, the relatively large quantity of food, and the smallness of the tonsils, to admit the absurdity of such a view.

The tonsil is not, however, without its defenders. Matheny (*Med. Record*, Sept., 1901) sees in the tonsils a wall of defense for the deeper structures against infectious and inflammatory processes arising in the mouth and nasopharynx, and warns us against ruthlessly destroying this wall of defense. In a similar vein, Manfredi (*Virchow's Arch.*, 1899) describes lymph nodes as protecting the organism in three ways: (1) By filtration; (2) by weakening the virulence of the microorganisms that reach them; (3) by allowing the whole organism to obtain a greater or lesser degree of immunity while the first two processes are going on.

Manfredi's reasoning was applied to lymph nodes in general, and is therefore applicable to the tonsils also. It strikes me that these authors are putting the cart before the horse, as far as the tonsils are concerned, and that what they claim as beneficial functions are in reality sources of danger to the organism. The only really good function of the tonsil is, as far as I can see, the elaboration of a small amount of young leukocytes, a view which I find expressed in George B. Wood's article on "Hypertrophy of the Pharyngeal Tonsil" in *American Medicine* for October, 1903. That this elaboration of young leukocytes may furnish material for a mild protection cannot be doubted. But the amount furnished is so small that the protection afforded must of necessity be quite limited. Another thing to be considered in this connection is that when a protective secretion is overwhelmed by the number of bacteria offered it for destruction it becomes an excellent culture medium for the last comers, thus reversing its role.

*Read by title at the Thirty-fourth Annual Meeting of the State Society, Paso Robles, April, 1904.

Then the bad function, the absorptive function of the tonsil, comes into play, and how great this is we can readily appreciate when we consider the acute toxemia to which even a mild case of tonsillitis gives rise. Considering the small amount of local change in a limited area, there is no inflammatory disturbance which causes such a decided disturbance of the organism. Pains through the limbs, the back, loss of appetite, inability to work or even to think, all come on within a few hours, to vanish as soon as the local trouble has ceased. A veritable tempest in a teapot, seemingly, if the attack remain solitary, but a thing of grave import if the attacks recur often, as they are apt to do if the conditions of the tissue in the ring are favorable. The patient does not recover completely from the attacks, but ends by presenting a condition of mild marasmus, for which the cause is often sought in other directions.

In spite of the number of articles which have appeared relative to this subject, the matter is alluded to in the recent text-books in a cursory way only; but I am sure that before long the data which have been collected will be elaborated. I know that many of my listeners could, by thinking back, find numerous cases in point. Only three weeks ago I saw a man and wife, both otherwise healthy, who presented a peritonsillar inflammation which was followed in both by an attack of articular rheumatism three days later. Looking back I can find a number of similar cases which I misunderstood, because I adhered to the old way of putting number two before number one.

What has assured the tonsillar theory such a ready welcome is that with it the origin of a number of diseases is explained, whose etiology hitherto seemed most obscure. Take as a salient example rheumatism. Having all the earmarks of an infectious disease, whose causative factor, according to our views of to-day, must be some germ, there was no way to account for the entrance of the germ into the organism. While it was well known that acute articular rheumatism comes on most often after exposure to damp and cold, especially when the patient was fatigued, one could hardly understand how the pathognomonic factor could enter through the skin, notably the best resisting tissue of the body, and the one which was seemingly exposed to the noxa. When, however, we remember that it is under the very same conditions that several forms of tonsillitis begin; and when, furthermore, we consider that acute articular rheumatism is a disease of early life; and when we take into account also the fact that a large number of cases of acute articular rheumatism are known to be preceded by tonsillitis, and that in a great number it is probably present but overlooked, we must acknowledge the plausibility of the tonsils being the starting point of the disease. Garrod found tonsillitis preceding acute articular rheumatism in 80% of his patients, and other observers have found almost as great a percentage. Our attention having been drawn to this etiological factor, I am sure that we shall find it quite often.

The mouth and nasopharynx, even in the healthy individual, are always teeming with numerous bacteria. As many as seventy different kinds have been differentiated, but those receiving most attention are the streptococci and staphylococci, because these are supposed to be the chief offenders in many of the diseases with which we are here dealing. Whether these two are the real causative factors is a matter open to doubt, but the fact that they are so often found in the joints and on the cardiac leaflets has made them objects of suspicion. Perhaps they are not the real offenders, but rather a very fine coccus which has lately been discovered by F. Meyer of Berlin, which he found in the places of predilection, and with which he was able to cause polyarthritis in animals. Very interesting in this regard are the studies of Dr. Menzer of the Berlin Charité, who in a number of cases of acute articular rheumatism, excised part of the tonsillar tissue, and on the proper culture media always obtained colonies of streptococci. However, as he suggests, streptococci have become the fashion since Wasserman's publication, and the real culprit may be overlooked in searching for the supposed one. Whether the short streptococcus found in the mouth at all times is the same as the long streptococcus of acknowledged virulence or merely an innocuous form, is another matter of doubt. The latter view is entertained by Biondi, Kurth, Pobdielsky, Dornberger and others, whereas Hilpert could find no difference between the form found in the so-called healthy mouth and that found in or upon inflamed tonsils.

Another question of interest that presents itself here is: Granted that the starting point for the rheumatic phenomena lies in the tonsils, are the distant manifestations due to the migration of the germs themselves or of their products? Menzer, in the experiments already mentioned, could not find a satisfactory amount of bacteria either in the serum taken from the inflamed joints of the patients or those of the animals experimented on. If we turn to some of the skin affections which are allied to rheumatism, and which are also supposedly due to tonsillar affections, and notice the similarity of these skin affections to those which are caused by the injection of antitoxin and other serum products from which the living organisms have been carefully removed, we must entertain the idea that in rheumatism we are dealing with a modified pyemia, for the production of which the absorptive power of the tonsils is largely, if not always, to blame. An inverted proof is the fact that swelling of the joints simulating acute athritis often occurs in pyemia from other sources.

The next thing that suggests itself is the heart, which is so often affected in rheumatism as to make the connection between the two seem most intimate. And, as a matter of fact, there are numerous observations to prove that often the starting point of a heart lesion lies in the tonsil. I wish to refer to the very able paper read by Dr. Philip K. Brown of San Francisco at the last meeting of the American Laryngological Society, which is still fresh in the minds of many of you. In May, 1899, Frederick A. Packard of Philadelphia reported five cases of endocarditis following acute angina, in three of which the heart was known to be sound before the attack of angina. Singer reports four similar cases. Packard states he has been astonished at the frequency of cases of endocarditis without rheumatism which gave a history of one or more attacks of acute and severe sore throat. Roeger found in 120 cases of tonsillitis, heart murmurs in 20%. In a number of these cases the murmurs developed after the patient entered the hospital, and in those who already had murmurs on entering, the intensity of the murmurs was increased. In a number of other cases heart murmurs developed in healthy hearts a short time after the attack of tonsillitis had passed off. One difficulty in estimating the connection of these two conditions lies in the fact that the true character of endocarditis has not been satisfactorily determined. Litten says that there is no such thing as primary endocarditis, and would make two great classes of secondary endocarditis, septic and mycotic. In regard to this second class, Lenhartz has failed to find any specific germs in the cultures made from the valves of rheumatic hearts; at least he has not found the germs which have been looked upon as the specific exciters, so that we are to look upon this condition either as a septic one, or to conclude that the specific germ for rheumatism has not yet been found. In fact, the subject of rheumatism as a whole will have to be gone over far more carefully than it has been before we can get conclusive reasoning on this matter. The real and

pseudo-rheumatic conditions will have to be better separated, and the bacteriology revised.

Pleuritis is another condition which has been traced directly to tonsillar origin. The cases are somewhat isolated as yet, but there is no doubt that this will explain many cases of pleurisy which have hitherto been classed as cryptogenetic.

Another disease of obscure origin which is interesting in this connection is chorea, the dependence of which on rheumatism has long been known. As long ago as 1880 Leube urged the chemico-infectious nature of this disorder, and it is interesting to note that Packard has observed two cases of chorea coming on without intervening rheumatism. Rheumatism has long had the reputation of being one of the diseases which are transmissible to the offspring, the idea being that the hereditary taint consisted in the composition of the blood or the susceptibility of certain parts to rheumatic insult. In the light of our present subject I should rather be inclined to look upon the peculiar conformation of the tonsillar tissue as the thing which is inherited. That this can be and is inherited we well know. Think how enlarged tonsils, adenoid hypertrophy, etc., due to a peculiar lymphatic diathesis, run in families.

Peritonitis, orchitis, hydrocele, mumps, and even an affection of the spinal cord have been traced to attacks of tonsillitis. Forcheimer refers to five cases of jaundice, appearing in each case in less than ten days after an attack of tonsillitis, all gastrointestinal affections having been carefully excluded. He also speaks of two cases of appendicitis which he traces directly to tonsillitis. Cases of nephritis, phlebitis, acute yellow atrophy of the liver have also been described which are supposed to have originated in throat affections. The origin of the so-called rheumatic skin affections and of the febrile exanthemata is also laid in the same locality. How much truth there is in these claims time and observation will tell.

I do not want to leave the subject without speaking of a condition which we see daily, and which is of more importance to us than the occasional acute disturbances for which the lymphoid ring has been blamed. Without bringing up the much-described condition of lymphoid hyperplasia of the oropharynx and its sequelæ, I want to point to the fact that many of these cases are suffering from chronic toxemia. The toxins are prepared either in the deep crypts of the tonsils or in the deep reduplications and folds of the adenoid tissue. Often there will be a chronic abscess in the peritonsillar tissue. From these a constant stream of toxins with all its depressant effects is entering the system, and the removal of these foci alone will produce wonderful results. We have all been highly gratified to notice the improvement, especially in children on whom we have successfully operated for removal of the lymphoid ring hyperplasias. From pale, listless, flabby, flat-chested children, they are transformed in a few months into red-cheeked, bright-eyed, full-chested, ambitious little men and women, whose main difficulty lies in getting enough to eat. Before that they looked like victims of chronic alkaloidal poisoning, and as a matter of fact they were the victims of chronic poisoning, the poison being the toxin elaborated in the tonsil and its allied tissue. We are inclined to think that the improvement is due wholly to the improved oxigenation of the blood through the better facilities afforded for breathing, but I think a large part of the improvement due to the change cited above.

Not only the flora of the mouth, but also the fauna has been accused of pathological mischief. While as yet a theory which will be received with caution, still it is worth mentioning that Paul Cohnheim of Berlin has attributed the origin of carcinomata of the œsophagus and stomach largely to infusoria, trichonomads, which have been found in the mouth, coming from diseased teeth. That dental caries is responsible for the presence of a large number of bacteria is undoubted, and emphasizes the importance of the care of the teeth, and their frequent examination, even by the physician.

I have purposely avoided saying anything about the role played by the tonsils in the production of tuberculosis; not that I underrate their importance in this regard, nor because I could not find numerous references to this point, but because I was afraid that it would carry both myself and those who may be kind enough to discuss this paper, beyond the time limit, were I to take up this phase of the subject.

In closing, I want to acknowledge my indebtedness to Dr. Frederick A. Packard of Philadelphia, whose paper on "Infection Through the Tonsils," read before the New York Academy of Medicine in December, 1899, was the best and most complete article I could find on the subject.

REPORT OF CASES SIMULATING GRAVE MASTOIDITIS.*

By FRED BAKER, M. D., San Diego.

STRANGE or rare conditions involving difficulties of diagnosis in diseases which endanger life or the integrity of important function are always worth reporting. The following case fulfills these conditions, while the succeeding cases, though less interesting and important, illustrate another phase of the same disease:

Case 1—J. C., male, age 19, was referred to me May 22, 1900, by Dr. J. C. Larzelere of Escondido, for polypus in the right ear. I removed the polypus, which was protruding through a medium-sized perforation of the drum, with snare and forceps, and cauterized the stump with pure chromic acid. Healing was rapid, and I discharged him on July 6, 1900, with a sound drum membrane and hearing distance equal to 9-48 by the watch test. At the start, marked dizziness was present, so greatly aggravated by pressure on the polypus that operation was extremely tedious, and somewhat difficult. The patient suffered from severe pain, centering in the mastoid, but there was no swelling, no great aggravation of the pain on pressure or percussion, and the temperature was normal during the whole time that he was in my charge. At first I feared that a mastoid operation would be necessary, and warned the patient's friends of the fact; but as all unfavorable symptoms gradually disappeared, the idea was soon abandoned. February 22, 1901, the same patient drove to town, a distance of about forty-three miles; but as I was absent from home I did not see him until the morning of the 23d. The history given was as follows: About ten days before, he had been taken down with "grip." There were several days of chilling, with high fever, after which he improved. Then he got up and attempted to do some work. Almost immediately he had a severe earache on the side previously affected, resulting in rupture of the drum and a very free discharge. Supposing that now the ear disease was the only important matter, he came directly to me. I found a large opening in the lower anterior portion of the drum, from which issued a free mucopurulent discharge; temperature 101.2; pulse not recorded, but averaging rather slow for the temperature, this proving the rule throughout the sickness; general appearance very bad, which I ascribed to the forty-mile drive of the preceding day. Patient complained of some dizziness and of very severe pain in the ear and mastoid. The mastoid region was swollen, somewhat boggy to the touch, and both pressure and percussion increased the pain. His mother reported that at midnight he had suffered from a severe chill, followed by high fever, which had subsided gradually. Nearly every case of suppurative otitis media accompanying "grip" which has come under my observation has been complicated by more or less mastoid pain. Every such case has made me anxious, but so far, possibly by a large measure of good luck, I have not operated in a single case, nor has any such case proved to be a mastoiditis. A considerable series of such cases without the necessity for operation has made me willing to take some chances, so I did not operate, but began palliative treatment. Just at midnight I was called by telephone; found patient shaking as if in an ague chill, and temperature at 105.5; was able to control the chill and temperature very quickly with whisky, phenacetin and dry heat, and by morning the condition was almost the same as the day before, the temperature having gone down to 101.4. Early in the morning (February 24), I called in consultation Drs. T. L. and C. L. Magee. Dr. C. L. Magee made a blood count, reporting a trifle less than 9,000 white blood corpuscles to the cubic millimeter. We decided that he did not have

*Read at the Thirty-fourth Annual Meeting of the State Society, Paso Robles, April 19-21, 1904.